REMARKS/ARGUMENTS

Claims 25 and 26 are amended as suggested by the Examiner. Support for the amendment can be found at, e.g., page 3, lines 7-19 and page 13, lines 20-21 of the originally filed application. No new matter is added. Upon entry of the above amendments, claims 1-3, 8-11, 13-14, 16-17, and 20-28 are pending. Reconsideration of the present application is respectfully solicited in view of the above amendments and the following remarks.

I. Claim Rejections under 35 U.S.C. § 112

Claims 23-26 are rejected under 35 U.S.C. § 112, second paragraph as being indefinite.

Specifically, with regard to claims 23-24, the Examiner states that the expression "a proportion of the SiN group in the empirical formula for said first phosphor is replaced by AlO" is not understood, because there is no SiN group identified in the formula of the first phosphor $M_{(1-c)}Si_2O_2N_2:D_c$. Applicants disagree. A person of ordinary skill in the art would readily understand that the formula of the first phosphor $M_{(1-c)}Si_2O_2N_2:D_c$ comprises a group of $(SiN)_2$. *See* also page 7, lines 19-21 of the application. A similar expression has been accepted and used in other publications, such as in claim 5 of U.S. Patent No. 7,550,095.

The Examiner's interpretation of claims 23-24 for the purpose of examination that "SiN" means a precursor, based on page 4, line 20 of the specification, not a SiN group in the empirical formula for said first phosphor, is incorrect. As explained above, the SiN group is clearly included in the empirical formula of the first phosphor. Furthermore, page 4, line 20 of the specification, as referred to by the Examiner does not mention SiN; rather, it discusses the use of Si_3N_4, among other things, as the starting material in making an efficient phosphor for the Sr Sion type.

With regard to claims 25-26, Applicants have now amended claims 25-26 in accordance with the specification and the Examiner's suggestion. Specifically, claims 25-26 have now been amended to explicitly reflect that the Europium in the first phosphor is replaced by Mn.

Based on the foregoing, Applicants respectfully request that the rejections of claims 23-26 under 35 U.S.C. § 112, second paragraph, be withdrawn.

II. Claim Rejections under 35 U.S.C. § 103

A. Rejection of claims 1-3, 9-11, 13, 20, and 28 under 35 U.S.C. §103(a) as being unpatentable over Mueller, in view of the present application itself

Claims 1-3, 9-11, 13, 20, and 28 have been rejected under 35 U.S.C. §103(a) as being obvious over Mueller (USP 6,717,353) in view of the present application itself. Reconsideration and withdrawal of this rejection are respectfully requested.

Claim 1 has previously been amended to recite that Ra is greater than 90. Nowhere does Mueller disclose that Ra is greater than 90. While admitting that Mueller fails to disclose that Ra is greater than 90, the Examiner argues, "it would require no more than routine experimentation to tune Mueller LED, having the same light source and two phosphors as recited in the claim, to have an Ra>90, for one skilled in the art, simply by following the teachings of Mueller." See paragraph spanning pages 4 and 5 of the Office Action. Applicants respectfully disagree.

The Examiner first refers to page 11, second full paragraph of the specification of the present application to conclude that the LED will have an Ra of greater than 90 when the second phosphor has a molar ratio of Ca of 0.1 and the molar ratio of Eu of 0.05-0.1. Without conceding the correctness of the Examiner's conclusion, Applicants do not find any teachings in Mueller that would lead to a phosphor with an Ra of greater than 90, as discussed by the

Examiner, without undue experimentation. Specifically, to arrive at an LED as discussed by the Examiner, one needs to at least pick and select from Mueller as follows:

A. select a first phosphor having an empirical formula $M_{(1-c)}Si_2O_2N_2:D_c$, where M comprises Sr as the main constituent and D is doped with divalent Europium from Mueller's general formula $(Sr_{1-a-b}Ca_bBa_c)Si_xN_yO_z:Eu_a$ (a=0.002-0.2, b=0.0-0.25, c=0.0-0.25, x=1.5-2.5, y=1.5-2.5, z=1.5-2.5); to make such selection, one needs to

(1) pick 2 as "x" from the range of 1.5-2.5; AND

(2) pick 2 as "y" from the range of 1.5-2.5; AND

(3) pick 2 as "z" from the range of 1.5-2.5; AND

(4) pick 0.0 as "c" from 0.0-0.25 so that Sr+Ca+ Ba +D=1.0 to meet the requirement of M+D=1 (i.e., 1-c+c=1) as reflected in the formula of the first phosphor of claim 1 of the preset application; AND

B. select a second phosphor with a formula of $(Sr_{1-a-b-c}Ba_bCa_c)_2Si_5N_8:Eu_a$(a=0.002-0.2, b=0.0-1.0, c=0.0-1.0) from among four candidates disclosed in Mueller, i.e., $(Sr_{1-a-b-c}Ba_bCa_c)_2Si_5N_8:Eu_a$(a=0.002-0.2, b=0.0-1.0, c=0.0-1.0); $(Ca_{1-x-a}Sr_x)S:Eu_a$ (a=0.0005 . . . 0.01, x=0.0-1.0); $Ca_{1-a}SiN_2:Eu_a$ (a=0.002-0.2) and $(B_{1-x-a}Ca_x)Si_7N_{10}:Eu_a$ (a=0.002-0.2, x=0.0-0.25), *see* col. 3, lines 45-51 of Mueller; AND then

C. select the second phosphor as a nitridosilicate of formula $(Ca,Sr)_2Si_5N_8:Eu$ from $(Sr_{1-a-b-c}Ba_bCa_c)_2Si_5N_8:Eu_a$(a=0.002-0.2, b=0.0-1.0, c=0.0-1.0); to make such selection, ones needs to:

(1) select 0 as "b" from the range of 0.0-1.0; AND

(2) select 0.1 as "c" from 0.0-1.0; AND

(3) select 0.05-0.1 as "a" from the range of 0.002-0.2.

The selection of C(2) and C(3) must be made to arrive an LED having an Ra>90 as discussed by the Examiner (i.e., the second phosphor has a molar ratio of Ca of 0.1 and the molar ratio of Eu of 0.05-0.1).

As shown above, to arrive at the present invention from Mueller as proposed by the Examiner, one must pick and select from an infinite number of possibilities. Mueller does not provide any specific teaching to lead one of ordinary skill in the art to arrive at the present invention. Therefore, one of ordinary skill in the art would not arrive at the present invention from Mueller, as proposed by the Examiner, without undue experimentation.

In fact, if anything, Mueller teaches away from the present invention. As shown at col. 4, the third table of Mueller, when $SrSi_5N_8$:Eu is used together with Sr-SiON, each of the Ra values listed therein is below 90. On the other hand, when SrS:Eu is used together with Sr-SiON, as shown at col. 4, the first table of Mueller, the maximum Ra value is 90, which is greater than those obtained from the use of $SrSi_5N_8$:Eu. Therefore, if a person of ordinary skill in the art were to obtain a higher Ra, s/he would use SrS:Eu, rather than $SrSi_5N_8$:Eu, and therefore leading away from the use of $(Ca,Sr)_2Si_5N_8$:Eu, which is the second phosphor of the present application.

Similarly, as stated at col. 4, lines 34-37 of Muller, "The use of $(Sr,Ca)S:Eu^{2+}$ as the red emitting phosphor is expected to offer better color rendering than $CaS:Eu^{2+}$ devices illustrated in FIG. 6 and worse color rendering than $SrS:Eu^{2+}$ devices illustrated in FIG. 5." This teaching would lead away a person of ordinary skill in the art from a second formula with the presence of Ca, let alone $(Ca,Sr)_2Si_5N_8$:Eu, which is the second phosphor of the present application.

For at least the above reasons, claim 1 and its dependent claims 3, 9-11, 13, and 20 are not obvious over Mueller and the present application itself under 35 U.S.C. §103(a).

Regarding claim 28, it does not recite that Ra is >90, but additionally recites that the emission of the oxynitridosilicate has a dominant wavelength λ_{dom} in the range from 550 to 570 nm. Therefore, to arrive at the invention of claim 28, one still needs to make various selections as listed above (other than C(2) and C(3)) in connection with claim 1 plus the selection of a dominant wavelength λ_{dom} in the range from 550 to 570 nm from infinite number of possibilities based on Mueller. In the absence of any further instruction, one of ordinary skill in the art would not arrive at the invention of claim 28 of the present application from Muller without undue experimentation. Therefore, claim 28 is also patentable over Mueller and the present application itself under 35 U.S.C. §103(a).

Although the Examiner now acknowledges that "It is well established that the disclosure of a genus in the prior art is not necessarily a disclosure of every species that is a member of that genus", the Examiner argues that it would be obvious to pick a specific value from the range of Muller. *See* pages 14-16 of the Office Action. But the Examiner fails to consider that there are a number of variables here, and picking and selecting a specific value or range for each of these variables would result in an infinite number of different combinations.

Based on the foregoing, Applicants respectfully request that the rejection of claims 1-3, 9-11, 13, 20, and 28 under 35 U.S.C. §103(a) be withdrawn.

B. Rejection of claims 8, 16, and 17 under 35 U.S.C. §103(a) as being unpatentable over Mueller as applied to claim 1 above, in view of Bischoff

Claims 8, 16 and 17 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Mueller in view of Bischoff (USP 6,158,882).

This obviousness rejection relies on Mueller as the primary reference in combination with Bischoff as the secondary reference. Bischoff is cited to demonstrate that certain additional

features recited in dependent claims have been known in the art. Bischoff cannot remedy the deficiencies discussed above in connection with claim 1. Therefore, a combination of the primary reference Mueller with Bischoff would not lead to the invention recited in any claim that depends from independent claim 1, including claims 8, 16, and 17. Withdrawal of this obviousness rejection is, therefore, respectfully requested.

C. Rejection of claim 14 under 35 U.S.C. §103(a) as being unpatentable over Mueller in view of Ellens.

Claim 14 has been rejected under 35 U.S.C. §103(a) as being unpatentable over Mueller in view of Ellens (USP 2002/0105269).

This rejection relies on Mueller as the primary reference in combination with Ellens as the secondary reference. Ellens is cited to demonstrate that certain additional features recited in dependent claim 4 have been known in the art. Ellens cannot remedy the deficiencies discussed above in connection with claim 1. Therefore, a combination of the primary reference Mueller with Ellens would not lead to the invention recited in any claim that depends from independent claim 1, including claim 14. Withdrawal of this obviousness rejection is, therefore, respectfully requested.

D. Rejection of claims 21-22 and 25-27 under 35 U.S.C. §103(a) as being unpatentable over Mueller in view of Ellens.

Claims 21-22 and 25-27 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Mueller in view of Ellens (USP 2002/0105269).

Claims 21-22 and 25-27 are similar to claim 1, but 1) none of them recites Ra is >90 as in claim 1; 2) these claims recite some additional limitations, such as "M is replaced by Li and/or La and/or Na and/or Y" (claim 21), "the proportion of M replaced by Li and/or La and/or Na

and/or Y is up to 30 mol%" (claim 22), "a proportion of Europium in the first phosphor is replaced by Mn" (claim 25); "the proportion of Europium replaced by Mn is up to 30mol %" (claim 26); "the chip is an InGaN chip" (claim 27). Therefore, to arrive at the invention of any of claims 21-22 and 25-27, one still needs to make various selections as listed above (other than C(2) and C(3)) in connection with claim 1 plus the selection of additional limitations recited in these claims based on the second reference Ellens. In the absence of any further instructions, one of ordinary skill in the art would not arrive at the invention of any of claims 21-22 and 25-27 of the present application based on the infinite number of possibilities disclosed in Muller and Ellens without undue experimentation. Therefore, claims 21-22 and 25-27 are also patentable over Mueller and Ellens under 35 U.S.C. §103(a). Withdrawal of this obviousness rejection is, therefore, respectfully requested.

III. Claim Rejections under 35 U.S.C. § 102 (e)

Claims 23 and 24 are rejected under 35 U.S.C. § 102(e) as being anticipated by Muller. Applicants disagree.

Claims 23-24 are similar to claim 1, but 1) neither of them recites Ra is >90 as claim 1; 2) these claims recite some additional limitations, such as "a proportion of the SiN group in the empirical formula for said first phosphor is replaced by AlO" (claim 23); and "the proportion of the SiN group in the empirical formula for said first phosphor replaced by AlO is up to 30 mol %" (claim 24).

The Examiner interprets that the additional claim limitation concerning SiN is drawn to a precursor material and therefore does not distinguish claims 23 and 24 over Mueller. As discussed above in connection with the rejection under 35 U.S.C. § 112, second paragraph, this

interpretation is incorrect. Nowhere does Mueller disclose any of these additional limitations concerning the replacement of SiN of the formula of the first phosphor with AlO. Therefore, for at least this reason, claims 23-24 are not anticipated under 35 U.S.C. § 102(e) by Mueller.

Moreover, for similar reasons discussed above in connection with claim 1, many other limitations recited in claim 23-24 individually or in combination are also not taught by Mueller. Therefore, claims 23-24 are patentable under both 35 U.S.C. § 102 and 35 U.S.C. § 103. Withdrawal of the rejection of claims 23-24 is, therefore, respectfully requested.

CONCLUSION

Any fees or charges required at this time in connection with the present application may be charged to our Patent and Trademark Office Deposit Account No. 03-2412.

Based on the foregoing, it is believed that the present application has been placed in condition for allowance. Early and favorable consideration is respectfully requested.

Respectfully submitted,
COHEN PONTANI LIEBERMAN & PAVANE LLP

By /Thomas Langer/
Thomas Langer
Reg. No. 27,264
551 Fifth Avenue, Suite 1210
New York, New York 10176
(212) 687-2770

Dated: August 19, 2010